

II. ALTERNATIVES

A. INTRODUCTION

A range of reasonable alternatives was developed. They addressed the project needs, the application of engineering design criteria, and the avoidance and minimization of adverse environmental impacts. The alternatives analysis process relied heavily on input from the City of Bangor. Public and agency involvement were undertaken to obtain input, identify concerns, and modify and refine the alternatives. The remainder of this section is divided into four subsections:

- Project History
- Alternatives Considered but Eliminated From Detailed Analysis
- Alternatives Retained for Further Study
- Summary of Predicted Effects

B. PROJECT HISTORY

In 1991, the Bangor Area Comprehensive Transportation System (BACTS) and the Metropolitan Planning Organization (MPO) for the Bangor urbanized area, completed a regional transportation planning study for the Bangor area entitled *BACTS Major Street and Highway Study* (T.Y. Lin International 1991). This study identified deficiencies based on existing and future traffic volumes, and then identified, analyzed, and recommended solutions to mitigate the roadway deficiencies. The study concluded that three critical intersections in the I-95/Hogan Road Interchange area would exhibit capacity deficiencies by the mid-1990s. The three intersections are:

- Hogan Road at I-95 northbound ramps.
- Hogan Road at I-95 southbound ramps.
- Hogan Road at Bangor Mall Boulevard and Springer Drive.

The 1991 BACTS *Major Street and Highway Study* considered three potential improvement alternatives: Transportation Systems Management (TSM) improvements, reconfiguring the existing diamond interchange at I-95/Hogan Road, and constructing a new interchange or interchanges on I-95 in the Bangor Mall area.

The study identified a number of TSM improvements that could be implemented to maximize the effectiveness of the existing Hogan Road interchange and adjacent roadways and intersections. TSM improvements attempt to increase the capacity of a roadway segment through low-cost, low-impact physical improvements such as upgrading intersections or modifying the timing of traffic signals. Many of the TSM recommendations of that study have now been implemented including improved lane markings, signing, traffic signal modification, and the addition of lanes at major intersections (Table I-1, previous section).

Recognizing the limited duration of the effectiveness of these short-term improvements, and given the projected growth in traffic in the Bangor Mall area, it

became apparent that the configuration of the existing I-95/Hogan Road interchange was one of the major contributing factors to traffic congestion around Hogan Road. The BACTS study evaluated several alternatives for the reconfiguration of the I-95/Hogan Road interchange. However, because development near the interchange constrains significant modification, the study concluded that the overall LOS of the interchange and key intersections along Hogan Road could not be substantially improved without significant impact to adjacent land uses.

Considering these limitations, the long-range element of the BACTS study focused on the development and evaluation of alternative locations for a new major point of access to the Bangor Mall area, supplementing the I-95/Hogan Road interchange. Alternatives developed and evaluated included a connector road between Hogan Road and Burleigh Road, network diversion of traffic, new interchanges with I-95 at Chase Road, Stillwater Avenue and directly to the Bangor Mall, and various combinations of these alternatives. A total of 14 alternatives were developed and evaluated as a part of the BACTS study.

According to the BACTS study, an interchange between I-95 and Stillwater Avenue appeared to be the single most effective alternative in reducing demand through the three critical Hogan Road intersections. An interchange at Stillwater Avenue would provide additional access to the area in closer proximity to the Bangor Mall and I-95/Hogan Road interchange than the other alternatives considered. The shift in traffic provided by this alternative affects Stillwater Avenue northeast of I-95. The construction of a new interchange between I-95 and Stillwater Avenue was considered by the BACTS study to be the smallest, least physically intrusive build alternative to satisfying the project needs.

Following the recommendation of the BACTS study, the MDOT began preparation of a *Request for New Access to the Interstate System*, a document to be submitted to the FHWA for approval (Figure II-1).

Working with an advisory committee comprised of local officials, businesses, and interested citizens, the MDOT developed several configurations for a new interchange between I-95 and Stillwater Avenue. The advisory committee identified a preferred configuration for the interchange in the spring of 1993 (MDOT 1993).

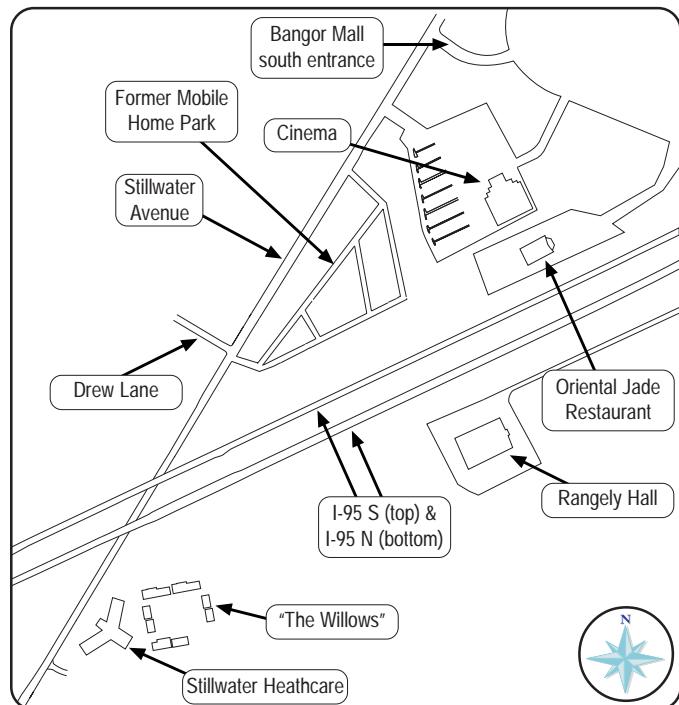


Figure II-1, Study area map

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On April 8, 1993, the City of Bangor held a public meeting to present a proposed new interchange at Stillwater Avenue. This meeting provided an opportunity for the public to become informed of the goals and objectives of the project and the details of the preferred interchange concept of the advisory committee. The proposed project received broad public support (MDOT 1993).

The MDOT prepared and submitted a report to the FHWA documenting a request for new access to I-95 at Stillwater Avenue. This report concluded:

- Many of the TSM improvements to increase the capacity of the I-95/Hogan Road interchange area and adjacent roadway segments would have a limited duration of effectiveness.
- Reconfiguring the existing I-95/Hogan Road diamond interchange to a configuration capable of providing improved traffic flow and capacity would result in prohibitive natural and social impacts to the adjoining areas.
- Broad public support exists for the construction of a new interchange on I-95 at Stillwater Avenue.

In 1993 the FHWA approved the request.

A public meeting was held on September 21, 1995. Three preliminary interchange concepts were presented and discussed at this meeting. Subsequently, a fourth alternative interchange design was developed to address the concerns of the public, reduce environmental impacts, respond to the city's long range planning needs, and adapt to the changing conditions in the study area.

C. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

The process of evaluating and eliminating alternatives was performed in two phases. First, the 14 preliminary alternatives developed in the BACTS *Major Street and Highway Study* were evaluated in a manner consistent with *The Highway Methodology Workbook* prepared by the U.S. Army Corps of Engineers — New England Division. The second phase was the evaluation of alternatives developed specifically for the proposed I-95/Stillwater Avenue interchange (MDOT 1995).

An overview of the existing environmental features in proximity to the 14 alternatives identified in the 1991 BACTS study was presented to representatives of the U.S. Army Corps of Engineers and other state and federal agencies at the MDOT interagency meeting on September 12, 1995. The purposes of this presentation were (1) to comparatively evaluate the potential impacts to traffic demand and the environment that would result from the implementation of the 14 alternatives, and (2) assist in decision making (i.e., separate alternatives to be dismissed from further consideration from those retained for detailed analysis). To ensure that only the least environmentally damaging alternatives which satisfied the project Purpose and Need were retained, the presentation emphasized the potential impacts of the alternatives to waters of the United States (including wetlands).

Each alternative, except one, was dismissed as not practicable or more environmentally damaging than the alternative retained. The alternative that was retained for further development and study was the construction of an interchange on I-95 with Stillwater Avenue. The first stage of the preliminary alternatives analysis concluded that the construction of a new interchange on I-95 with Stillwater Avenue was the optimum build solution for satisfying the project Purpose and Need.

Five alternatives were evaluated during the second phase of the preliminary alternatives analysis: the No-build Alternative and four build alternatives. While Alternatives 1, 2 and 3 would meet the project needs, these alternatives were determined to have greater impacts to wetlands and the residential areas adjacent to Stillwater Avenue than Alternative 4, and were dismissed from further study.

1. Alternative 1 — Trumpet Interchange

Alternative 1 is the construction of a trumpet interchange between I-95 and Stillwater Avenue. The I-95 northbound on and off-ramps would intersect Stillwater Avenue close to the Bangor Mall south entrance (Figure II-2). The I-95 southbound on and off-ramps would consist of slip ramps forming a half-diamond interchange adjacent to the I-95 overpass at Stillwater Avenue (this half-diamond interchange would be the same for alternatives 2 and 3). The I-95 northbound off-ramp of this alternative would connect to an

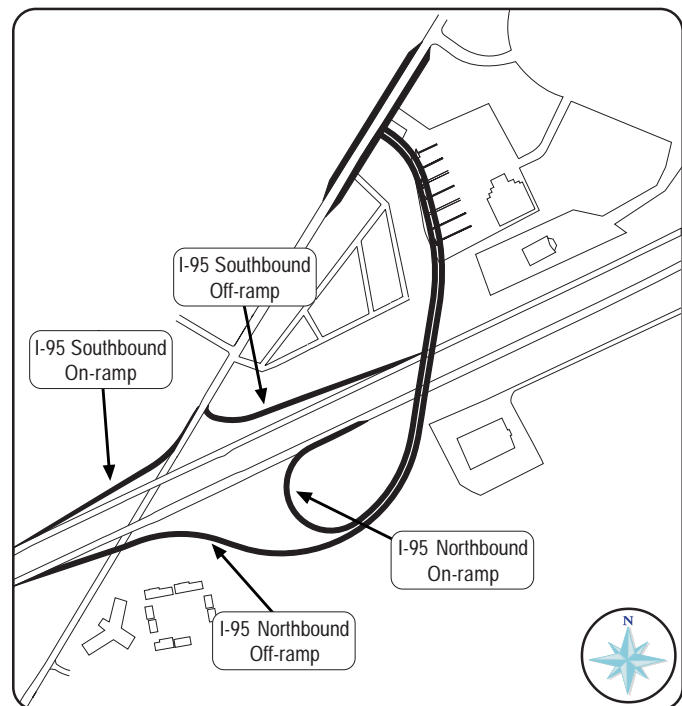


Figure II-2, Alternative 1

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additional northbound lane on Stillwater Avenue between the proposed I-95 northbound ramps and the Bangor Mall south entrance. Alternative 1 was the preferred configuration of a new interchange among the advisory committee assembled in support of the *Request for a New Access to the Interstate System* (MDOT May 1993) to FHWA.

Alternative 1 was projected to provide reduced traffic volumes and reduced congestion at the I-95/Hogan Road interchange area at levels similar to Alternative 4. Alternative 1 was dismissed from further study because it had greater impacts to wetlands (0.89 ha (2.2 ac.) versus 0.20 ha (0.5 ac.)), higher costs, and greater impacts to traffic and the residential areas adjacent to Stillwater Avenue than Alternative 4.

2. Alternative 2 — Modified Diamond Interchange

Alternative 2 is the construction of a modified diamond interchange between I-95 and Stillwater Avenue. The I-95 northbound on and off-ramps would intersect Stillwater Avenue immediately south of I-95 (Figure II-3). Similar to Alternatives 1 and 3, the I-95 southbound on and off-ramps would consist of slip ramps forming a half-diamond interchange. The I-95 northbound off-ramp would consist of a reverse ramp connecting to an acceleration lane northbound on Stillwater Avenue.

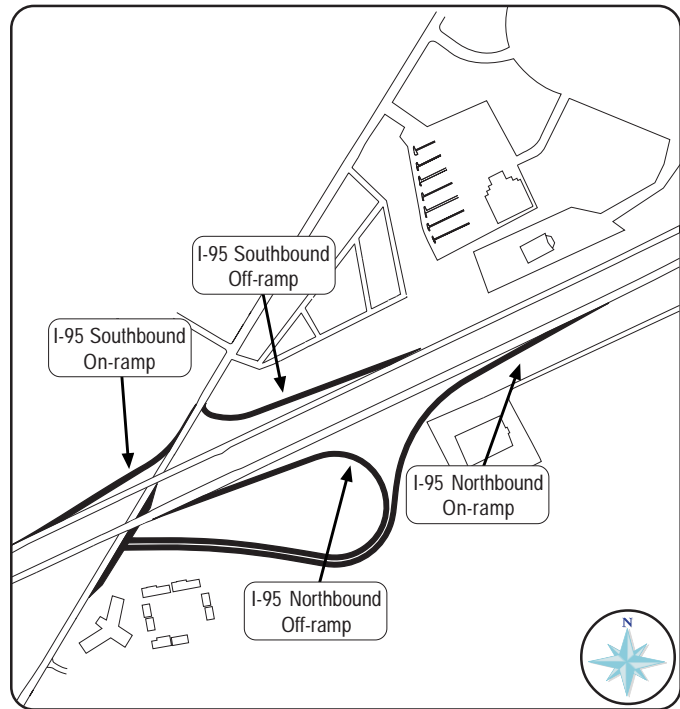


Figure II-3, Alternative 2

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Alternative 2 was projected to provide reduced traffic volumes and reduced congestion at the I-95/Hogan Road interchange area at levels similar to Alternative 4. Alternative 2 was dismissed from further study because it had greater impacts to wetlands (0.60 ha (1.5 ac.) versus 0.20 ha (0.5ac.)), greater impacts to traffic and the residential areas adjacent to Stillwater Avenue, and greater impacts to pedestrians and bicyclists than Alternative 4.

3. Alternative 3 — Diamond Interchange

Alternative 3 is the construction of a diamond interchange between I-95 and Stillwater Avenue (Figure II-4). Similar to Alternatives 1 and 2, the I-95 southbound on and off-ramps of Alternative 3 would consist of slip ramps forming one-half of the diamond interchange. The I-95 north-

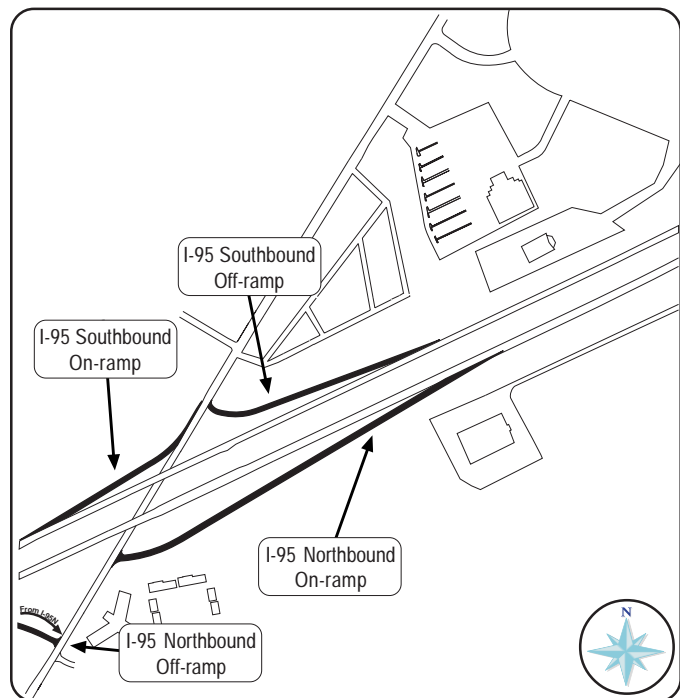


Figure II-4, Alternative 3

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bound on and off-ramps would be skewed; the off-ramp would intersect Stillwater Avenue opposite the Park East Apartments access drive to form a four-legged intersection. The on-ramp would be offset approximately 161.5 m (530 ft.) to the northeast on Stillwater Avenue closer to the I-95 overpass. A traffic signal was proposed at the intersection of Stillwater Avenue and the I-95 northbound off ramps/Park East access drive.

Alternative 3 was projected to provide reduced traffic volumes and reduced congestion at the I-95/Hogan Road interchange area at levels similar to Alternative 4. Alternative 3 was dismissed from further study because it had greater impacts to wetlands (0.48 ha (1.2 ac.) versus 0.20 ha (0.5 ac.)), greater impacts to traffic and the residential areas adjacent to Stillwater Avenue, and greater impacts to pedestrians and bicyclists than Alternative 4.

D. ALTERNATIVES RETAINED FOR DETAILED ANALYSIS

Two alternatives were retained for detailed study:

- The No-build Alternative
- Alternative 4 — a 3/4 trumpet interchange (no northbound on-ramp) with restricted left turns

1. The No-build Alternative

The No-build Alternative assumes the continuation of the present level of maintenance on the existing roadways surrounding the Bangor Mall with no substantial changes in infrastructure. Consequently, the existing roadways and current traffic circulation patterns would need to accommodate the design year traffic volumes.

Traffic volume will continue to increase along I-95, Hogan Road, and the adjoining roadways (Figure II-5). Under the No-build Alternative, the three key intersections with Hogan Road would operate at LOS F in the design year 2025 (MDOT 1998). The No-build Alternative will not improve the traffic flow in the area or help ensure a more orderly progression of planned development within and adjacent to the mall area. The No-build Alternative would result in adverse impacts to economic development of the area, air quality (along Hogan Road), and noise (Section IV, Environmental Consequences).

2. Alternative 4 — 3/4 Trumpet Interchange

Alternative 4 would consist of the construction of a 3/4 trumpet interchange between I-95 and Stillwater Avenue with no access provided from Stillwater Avenue to I-95 northbound (Figure II-6, page II-8). The I-95 southbound on and off-ramps would be situated further north and closer to the Bangor Mall on lands formerly developed as a mobile home park. The I-95 northbound off-ramp of this alternative would connect to an additional northbound lane on Stillwater Avenue between the proposed I-95 northbound ramps and the Bangor Mall south entrance. Turning lanes would be added to Stillwater Avenue.

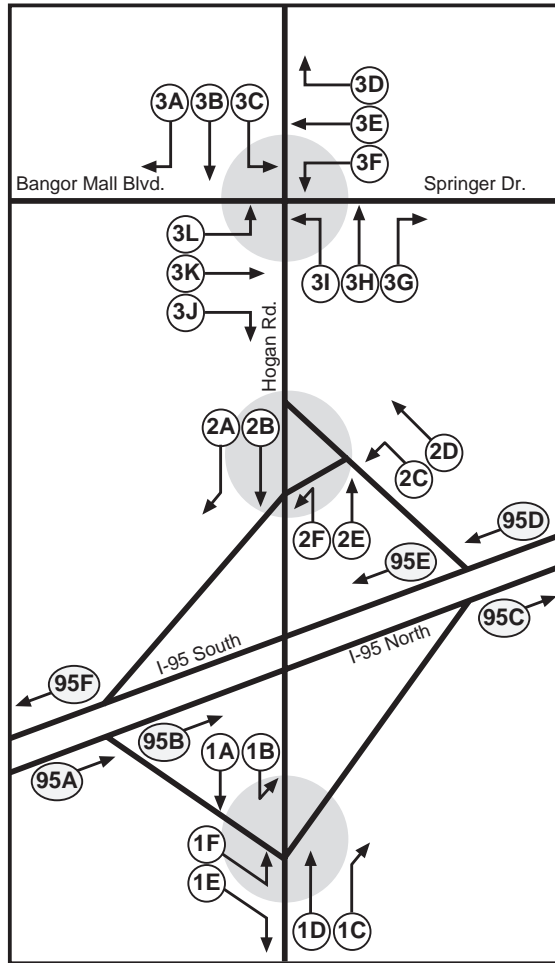


Figure II-5, No-build and Alternative 4 design hour traffic volumes for key intersections on Hogan Road

Movement	2005 No-build	2005 Build	2025 No-build	2025 Build
Intersection 3 — Hogan Road and Bangor Mall Road / Springer Drive				
3A	35	47	44	53
3B	1,268	484	2,276	910
3C	434	172	454	179
3D	426	278	435	297
3E	172	302	130	256
3F	547	565	580	592
3G	649	649	681	681
3H	1,351	573	2,358	1,037
3I	810	499	1,007	724
3J	689	712	816	1,191
3K	173	435	123	398
3L	92	117	88	136
Intersection 2 — Hogan Rd. and the I-95 Northbound Ramps				
2A	1,209	466	1,579	600
2B	1,295	1,295	2,093	2,093
2C	141	141	232	232
2D	414	280	542	324
2E	2,396	1,441	3,504	2,118
2F	362	391	609	645
Intersection 1 — Hogan Rd. and the I-95 Southbound Ramps				
1A	1,047	1,047	1,818	1,818
1B	389	389	507	507
1C	191	191	286	286
1D	1,385	1,385	2,324	2,324
1E	290	290	563	563
1F	1,373	447	1,789	439
Interstate 95				
95A	2,682	1,756	3,565	2,215
95B	1,019	1,019	1,213	1,213
95C	1,599	1,599	2,006	2,006
95D	1,731	1,731	2,174	2,174
95E	1,176	1,310	1,400	1,618
95F	2,747	2,167	3,583	2,863

The intersection of the interchange ramps and Stillwater Avenue would be controlled with traffic signals. Two left turns would be prohibited: (1) I-95 northbound off-ramp to Stillwater Avenue southbound, and (2) I-95 southbound off-ramp to Stillwater Avenue southbound. These prohibited left turns would be necessary to ensure an adequate LOS for the entire interchange, and to minimize the impacts of traffic to the residential areas adjacent to Stillwater Avenue.

A sidewalk would be provided along the eastern side of Stillwater Avenue from the south mall entrance through the intersection of the interchange ramps with Stillwater Avenue. A bicyclist and pedestrian refuge island would be provided (Figure II-7, next page).

Lighting for the interchange would be clustered to the north of I-95 and east of Stillwater Avenue.

Alternative 4 is projected to provide reduced traffic volumes and reduced congestion at the I-95/Hogan Road interchange area at levels similar to Alternatives 1, 2 and 3. The location of this interchange, south of the Hogan Road interchange, would offer northbound travelers on I-95 with destination in the Bangor Mall area a reasonable alternative to the Hogan Road interchange. This location would also provide a reasonable alternative for travelers with destinations on I-95 south of the study area.

The three key intersections in the I-95/Hogan Road interchange area are projected to operate at LOS C conditions for 2005 build conditions. By 2025, the three key intersections in the I-95/Hogan Road interchange area would improve in efficiency from LOS F (No-build) to LOSE (Alternative 4).

Some traffic congestion is projected for the proposed interchange by 2025. At ramp junctions with the I-95 main line, the LOS is constrained by the capacity

of the main line. For 2005, the I-95 northbound and southbound off-ramps would operate at LOS C; the southbound on-ramp would operate at LOS D. By 2025, the I-95 northbound and southbound off-ramps would operate at LOS D; the southbound on-ramp would operate at LOS F. The actual intersection with the proposed ramps at Stillwater Avenue would operate at LOS B and D under 2005 and 2025 conditions, respectively (MDOT 1998).

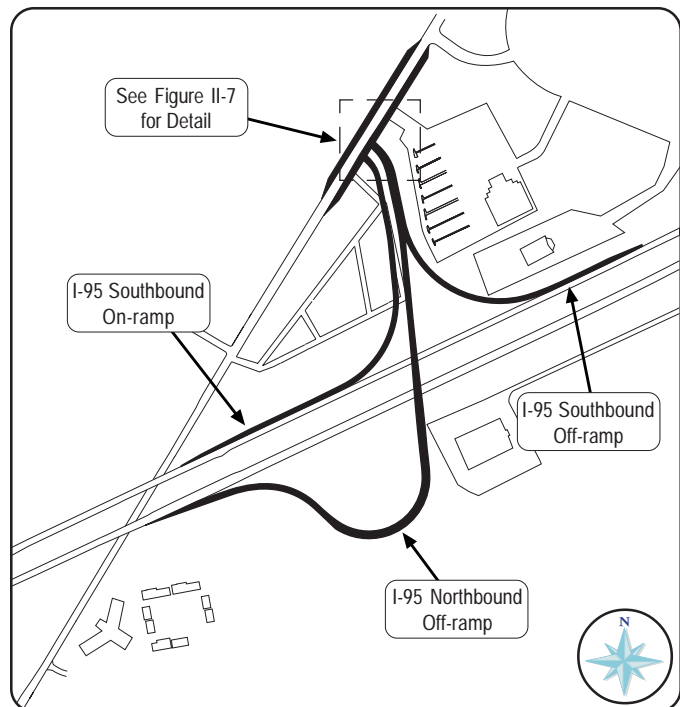


Figure II-6, Alternative 4

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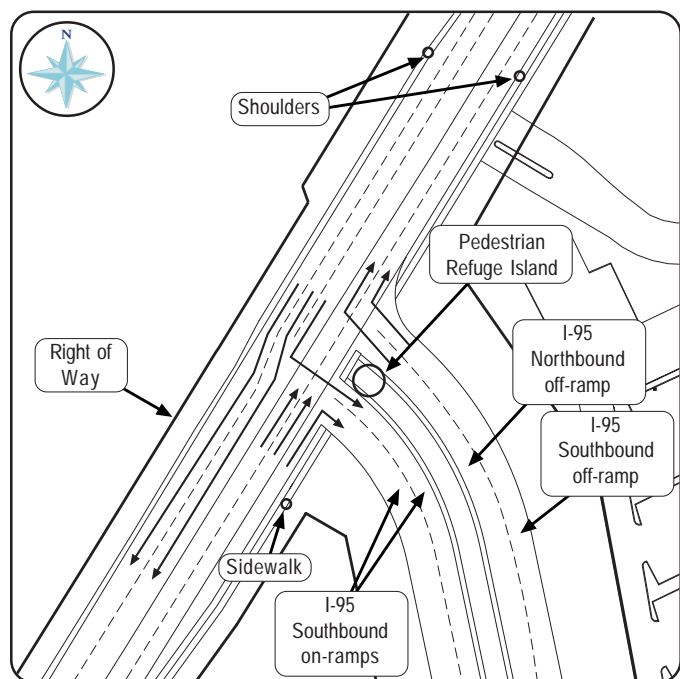


Figure II-7, Detail of additional lanes at Stillwater Ave.

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Alternative 4 is hereinafter referred to as the Preferred Alternative.

E. SUMMARY OF PREDICTED EFFECTS

The project is predicted to have minor impacts to the natural, socioeconomic and cultural resources in and adjacent to the project area.

1. Environmental Impact Matrix

A matrix was developed to summarize the natural resource impacts of the alternatives retained for detailed studies (Table II-1). The Preferred Alternative would impact 0.20 ha (0.5 ac.) of wetlands and 1.6 ha (4.2 ac.) of vegetation that would not be impacted by the No-build Alternative.

2. Socioeconomic Impact Matrix

A second matrix was developed to summarize the social and economic impacts of the alternatives retained for detailed studies (Table II-2). The Preferred Alternative would result in an improvement in air quality over the No-build Alternative. Additionally, the Preferred Alternative would indirectly facilitate continued growth and economic development in the surrounding area which would not be likely with the No-build Alternative.

Table II-1, Comparison of Natural Environment and Cultural Resource Impacts of the Alternatives Retained for Consideration

Alternatives	Satisfy Purpose		Satisfy Needs		Waters of the U.S.				Wildlife		Aquifers		Floodplains: (acres)	Community Wells Directly Impacted: (each)	Farmlands		Archaeological		Historic Properties Directly Impacted: (each)	Env. Risk Sites Directly Impacted: (each)
	Yes	No	Yes	No	NWI & Hydric Soils: (ha/ac)	NWI/ Hydric Soils: (ha/ac)	# of Wetlands Impacted: (each/acres)	Water Crossings Impacted: (each)	Undeveloped Wildlife Habitat: (acres)	Notable Wildlife Habitat Impacted: (each)	Surface Area Impacted: (acres)	High Yield Aquifers: (acres)			Active Farmland: (acres)	Prime Farmland Soils: (acres)	Sensitive Areas Impacted: (each)	Previously Recorded Sites Impacted: (each)		
No-Build		✓		✓	0/0	0/0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	✓		✓		1 / 2.5	1 / 2.5	1 / 0.50	0	4.2	0	4.2	0	0	0	0	4.2	0	0	0	0

Source: Adapted from “The Highway Methodology Workbook”, U.S. Army Corps of Engineers—New England Division

Table II-2, Comparison of Social Impacts of the Alternatives Retained for Consideration

Alternatives	Existing Land Use					Displacements	Community Characteristics	Economic Characteristics			Community Facilities and Services	Pedestrian & Bicycle Use
	Agriculture (acres)	Commercial (acres)	Residential (acres)	Undeveloped (acres)	Total (acres)			Local Road Main. Cost	Tax Revenue Loss	Businesses		
No-Build	0	0	0	0	0	0	No impact	n/a	No impact	Increased congestion in the study area.	Increased congestion could lead to delays in emergency service response times.	No impact
4	0	0	0	4.2	4.2	0	Increased traffic on Stillwater Ave.	n/a	No impact	Decreased congestion in the study area.	Improvement in emergency service response times.	No impact

Alternatives	Noise (impacted residences)	Air Quality	Public Parks & Recreation Lands	Secondary Impacts		Cumulative Impacts
				Comprehensive Planning	Regional	
No-Build	9	No exceedance of abatement criteria	No impact	Inconsistent with growth plans for Bangor Mall area.	May constrain future development.	No impacts
4	8	No exceedance of abatement criteria	No impact	Consistent with growth plans	Would facilitate economic growth; may contribute to conversion of 233 ac to commercial uses	No substantial impacts